Grand Avenue
Northwest Corridor Study

WORKING PAPER NO. 6

Long-Term Roadway Needs

June 26, 2001

Prepared for

MARICOPA ASSOCIATION of GOVERNMENTS

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TABLE OF CONTENTS

LIST OF EXHIBITS

EXECUTIVE SUMMARY

This working paper identifies the long-term roadway "needs" for the Grand Avenue Northwest Corridor, which extends from Loop 303 to Loop 101. The "needs" identified in this paper are derived in part from desires and opinions expressed by the public and participating agencies in several meetings held to date. Additional "needs" have been identified through the evaluation of existing and forecast traffic volumes. The "needs" will be further evaluated, cost estimates prepared, and the results will be presented in Working Paper No. 8 and to the public and agencies. Following these steps, recommendations will be formulated.

Future Traffic Design Volumes and Level of Service

The 2010 traffic design volumes for the Grand Avenue Northwest Corridor are shown in Exhibits 2.3 and 2.4. The 2010 design volumes on Grand Avenue range from 25,900 to 44,900 vehicles per day. The 2025 design volumes on Grand Avenue range from 40,800 to 57,100 vehicles per day. Three Grand Avenue intersections are expected to operate at LOS E or worse in 2010: Bell Road, Thunderbird Road, and 107th Avenue. In 2025, all the intersections except 103rd Avenue are expected to operate at LOS E or worse.

Capacity Deficiencies

Based on the capacity analysis of the intersections along Grand Avenue, three lanes in each direction on Grand Avenue are needed today through the 107th/Grand and Bell/Grand intersections to achieve LOS D. Grand Avenue will need to be widened to six lanes between Loop 101 and the Thunderbird/Grand intersection by 2010. Between the Thunderbird/Grand intersection and Loop 303, Grand Avenue needs to be widened to six lanes by 2025.

Intersection Needs

By widening Grand Avenue to six lanes as discussed above and providing additional through lanes on some cross streets and dual turn lanes at some intersections, each of the intersections along Grand Avenue will operate at LOS D or better in 2010 and 2025 with the exception of Bell Road. By 2025, Bell Road will need to be grade separated with Grand Avenue to obtain LOS D.

A grade separation at each hospital has been identified as a corridor need and as a solution for eliminating the possibility of access to the hospitals being blocked by trains.

Additional suggested intersection improvements include lowering the railroad at cross streets to match the grade of Grand Avenue, evaluation of safety devices such as gates at the railroad, extension of exclusive turn lanes to provide for more storage, better turn lane designations and more pavement marking extensions through intersections. Inadequate signal timing for pedestrians to cross intersections was also identified as a concern.

Roadside Development Needs

The lack of guardrail along sections of the drainage channel paralleling Grand Avenue has been raised as a major safety concern. Traffic signage has been identified as inadequate in meeting the needs of the elderly population. Suggested improvements for traffic signs include providing larger letters and clear and concise directions on signs. Improved street lighting has also been suggested.

There is community interest in further improvements and enhancements to the existing landscaping and ensuring maintenance of the aesthetic features that exist. Aesthetic treatment of any new transportation infrastructure is also desired. Attractive destination signage for West Valley Cities has also been requested.

Intelligent Transportation System Needs

A conduit along Grand Avenue for fiber-optic communications to support Smart Corridor traffic management functions such as traffic detection, closed circuit television cameras and variable message signs as well as signal coordination is needed. In addition, the Phase 1 Smart Corridor along Grand Avenue should be extend from Bell Road to Loop 303 (currently it is designated from Van Buren Street to Bell Road). ITS applications consistent with the MAG ITS Strategic Plan should be implement the whole length of the Grand Avenue corridor. Preemption of traffic signals for emergency vehicles is also needed along the corridor.

Other Needs

There is a potential opportunity to provide an additional continuous route through the study area by extending El Mirage Road across Grand Avenue with a grade separation. MAG and participating agencies will evaluate enhancement of east-west streets including Olive and Northern Avenues. Maintaining access to existing businesses and limiting new access to Grand Avenue are also needs in the corridor.

Please Note:

> The "needs" presented in this working paper are not recommendations. Instead, the "needs" are ideas that will be further evaluated in subsequent tasks of this corridor study.

1.0 INTRODUCTION

This working paper assesses the long-term roadway needs for the Grand Avenue Northwest Corridor. Long-term roadway needs were identified based on traffic forecasts for the corridor and input from the public and local agencies.

This working paper is one of several being produced for the Grand Avenue Northwest Corridor Study. The list of papers and current status is noted below:

Working Paper #1	Related Studies and Plans (completed)
Working Paper #2	Current and Projected Socioeconomic Projections (completed)
Working Paper #3	Transportation Facilities and Conditions (completed)
Working Paper #4	Environmental Issues and Title VI/Environmental Justice (completed)
Working Paper #5	Major Issues, Goals, and Policies (completed)
Working Paper #6	Long-Term Roadway Needs (draft completed)
Working Paper #7	Alternative Mode Needs (draft completed)
Working Paper #8	Development and Evaluation of Options (under development)

These working papers form the basis of the final report to be prepared near the end of the project.

2.0 FUTURE TRAFFIC VOLUMES

2.1 Traffic Forecasts

Traffic forecasts for the study area were prepared by MAG utilizing the EMME/2 regional transportation model. The model was run in January and February 2001 to forecast 2010 and 2025 traffic volumes along Grand Avenue. A 2000 model run was also produced to compare model output to existing traffic counts. This comparison of model-predicted weekday daily volumes to actual counts provides a basis for refinement (if necessary) of future traffic forecasts made by the model. The 2000 and 2010 model run utilized the Department of Economic Security (DES) Socioeconomic Projections that have been adopted by MAG. The 2010 street network was checked to reflect projects currently programmed in the MAG 2001-2005 Transportation Improvement Program.

A series of 2025 model forecasts were run to create 2025 design volumes for the corridor. Seven 2025 runs were made in all. All of the runs included a street network consistent with the MAG Long Range Transportation Plan (LRTP) and thus had Loop 303 coded as a four-lane expressway from I-10 to I-17. An expressway is defined as a highway with access only at signalized intersections spaced approximately one mile apart. Differences between the model

runs include the socioeconomic projections used and the coding of Grand Avenue both north and south of Loop 101.

South of Loop 101, Grand Avenue was coded for some of the model runs with the eight grade separation defined in the Grand Avenue Major Investment Study that are currently under design. In other runs, Grand Avenue was coded as an expressway as defined in the MAG Long Range Transportation Plan. North of Loop 101, Grand Avenue was coded with no improvements (No-Build) in one run, a full freeway in one run, a six-lane arterial street with some grade separations in one run, and a six-lane arterial street in the remaining runs.

As discussed in Working Paper No. 2 – Current and Projected Socioeconomic Conditions, an alternative higher growth scenario for year 2025 was developed for the influence area to be used in a sensitivity analysis. The purpose of the sensitivity analysis is to provide a means of determining the impact to future Grand Avenue traffic volumes if population and employment growth in the influence area are higher than the DES projections. Some of the model runs were made with 2025 MAG Design Projections and other runs were made with 2025 Alternative Higher Growth Projections. Refer to Working Paper No. 2 for more detail on the socioeconomic projections.

In summary, the following model runs listed in Exhibit 2.1 were used to forecast traffic volumes and develop design volumes. Exhibit 2.2 lists the traffic forecasts generated for each model run. The forecast volumes for each run were adjusted based on the comparison of 2000 model run volumes to actual 2000 counts. Forecasts were adjusted by adding/subtracting the difference between the 2000 model run volumes and actual counts.

2.2 Design Volumes

The 2010 traffic design volumes for the Grand Avenue Northwest Corridor are shown in Exhibits 2.3 and 2.4. These volumes are the same as the adjusted 2010 forecast volumes from MAG shown in Exhibit 2.2. The 2010 design volumes on Grand Avenue range from 25,900 to 44,900 vehicles per day.

The 2025 traffic design volumes are also shown in Exhibits 2.3 and 2.4. These volumes were chosen as the likely traffic volumes that will occur along the corridor for 2025. These design volumes were chosen based on analyzing the seven forecasts made for 2025. Model run #3 represents a no-build alternative for the corridor. By comparing model runs #3 and #5, it is apparent that with additional capacity on Grand Avenue, traffic volumes will increase significantly (+10,000 vehicles on some sections). Therefore, forecasts from alternative #3 were not used for design volumes.

Model runs #4 and #5 were compared to determine the difference in traffic forecasts based on whether Grand Avenue is an expressway south of Loop 101 or if it is an arterial with the MIS grade separations. The difference in forecasts between the two runs is insignificant for all segments of Grand Avenue except for between Loop 101 and 99th Avenue which shows an increase of 5,000 vehicles per day if an expressway is constructed south of Loop 101. A comparison of model runs #6 and #7 show similar results. Therefore, the model runs showing

Exhibit 2.1
List of Traffic Forecast Model Runs

1) 2000 MAG Adopted Projections with existing street network

2) 2010 MAG Adopted Projections with street network to include:
   - 2001-2005 Transportation Improvement Program Projects
   - Grand Avenue south of Loop 101 – MIS grade separations
   - Grand Avenue north of Loop 101 – no build
   - Loop 303 as a four lane expressway I-10 to Lake Pleasant Road

3) 2025 MAG Design Projections with street network to include:
   - MAG Long Range Plan
   - Grand Avenue south of Loop 101 – MIS grade separations
   - Grand Avenue north of Loop 101 – no build
   - Loop 303 as a four lane expressway I-10 to I-17

4) 2025 MAG Design Projections with street network to include:
   - MAG Long Range Plan
   - Grand Avenue south of Loop 101 – Expressway (as defined in MAG LRTP)
   - Grand Avenue north of Loop 101 – six lane arterial street
   - Loop 303 as a four lane expressway I-10 to I-17

5) 2025 MAG Design Projections with street network to include:
   - MAG Long Range Plan
   - Grand Avenue south of Loop 101 – MIS grade separations
   - Grand Avenue north of Loop 101 – six lane arterial street
   - Loop 303 as a four lane expressway I-10 to I-17

6) 2025 Alternative Higher Growth Projections with street network to include:
   - MAG Long Range Plan
   - Grand Avenue south of Loop 101 – Expressway (as defined in MAG LRTP)
   - Grand Avenue north of Loop 101 – six lane arterial street
   - Loop 303 as a four lane expressway I-10 to I-17

7) 2025 Alternative Higher Growth Projections with street network to include:
   - MAG Long Range Plan
   - Grand Avenue south of Loop 101 – MIS grade separations
   - Grand Avenue north of Loop 101 – six lane arterial street
   - Loop 303 as a four lane expressway I-10 to I-17

8) 2025 Alternative Higher Growth Projections with street network to include:
   - MAG Long Range Plan
   - Grand Avenue south of Loop 101 – MIS grade separations
   - Grand Avenue north of Loop 101 – six lane arterial street some grade separations
   - Loop 303 as a four lane expressway I-10 to I-17

9) 2025 Alternative Higher Growth Projections with street network to include:
   - MAG Long Range Plan
   - Grand Avenue south of Loop 101 – Expressway (as defined in MAG LRTP)
   - Grand Avenue north of Loop 101 – six lane freeway
   - Loop 303 as a four lane expressway I-10 to I-17

Exhibit 2.2
Forecast Traffic Volumes

			2025 Forecasts by Model Run (see Exhibit 2.1)						
Grand Avenue Segment	**2000**	**2010**	**# 3**	**# 4**	**# 5**	**# 6**	**# 7**	**# 8**	**# 9**
West of Loop 303	9,400	25,900	35,600	42,800	42,900	53,600	53,700	54,900	56,600
Loop 303 to RH Johnson/ Sunshine	13,500	31,100	34,200	45,900	46,000	50,000	50,200	45,700	48,100
RH Johnson to Meeker / Reems	17,600	30,000	34,900	49,000	49,000	53,000	53,000	45,700	48,100
Meeker to Litchfield	22,100	34,400	37,800	49,000	49,000	49,000	49,100	49,500	73,400
Litchfield to Bell	20,200	32,600	35,900	51,700	52,700	50,800	51,700	45,600	73,400
Bell to Dysart	23,300	27,600	32,900	49,500	49,200	49,400	48,800	48,900	98,000
Dysart to Greenway	27,100	29,600	32,600	42,800	42,700	43,300	42,700	40,900	98,000
Greenway to El Mirage Rd	36,100	39,700	43,700	49,500	49,600	51,500	51,100	47,800	98,000
El Mirage to Thompson Ranch/ Thunderbird	25,400	31,700	34,900	40,700	40,800	42,700	42,300	47,800	122,400
Thunderbird to 111th Ave	29,700	36,600	40,300	44,050	43,700	45,050	43,900	49,100	122,400
111th Ave to 107th Ave	33,900	41,500	45,700	47,400	46,600	47,400	45,400	50,300	122,400
107th Ave to 103rd Ave	33,900	42,700	47,000	49,900	48,800	49,700	47,800	49,700	136,100
103rd Ave to 99th Ave	37,400	44,900	49,400	52,300	51,000	52,000	50,100	49,000	136,100
99th Ave to Loop 101	35,000	42,000	46,200	62,500	57,100	61,700	55,600	60,800	152,500
East of Loop 101	24,500	29,800	38,600	63,400	42,600	61,000	40,900	53,400	138,300

			2025 Forecasts by Model Run (see Exhibit 2.1)						
Cross Street	**2000**	**2010**	**# 3**	**# 4**	**# 5**	**# 6**	**# 7**	**# 8**	**# 9**
Loop 303	4,500	11,900	44,800	44,800	44,700	51,000	50,800	53,500	52,400
RH Johnson/ Sunrise	10,400	14,600	21,000	20,700	20,600	26,100	26,200	19,000	23,200
Meeker/ Reems	15,900	21,100	25,600	26,000	26,100	36,600	31,500	37,300	36,300
Litchfield	4,400	13,600	20,700	18,500	17,200	15,700	15,100	9,600	14,400
Bell	32,800	40,400	56,400	56,900	57,300	56,400	56,100	61,000	54,900
Dysart	13,700	14,900	29,000	28,700	28,200	24,500	24,600	24,400	30,000
Greenway	11,600	14,100	20,000	19,700	19,300	16,700	15,900	36,900	16,100
Thunderbird/ Thompson Ranch	8,900	12,500	21,400	24,300	25,200	20,400	20,200	13,800	10,700
111th Ave	8,500	12,300	16,200	16,300	16,200	16,200	16,300	16,500	15,400
107th Ave	15,300	23,000	29,500	29,600	29,400	29,500	29,700	29,900	27,900
103rd Ave	12,700	14,000	15,900	16,300	16,100	16,500	16,300	13,200	13,800
99th Ave	17,800	27,400	35,100	37,900	36,600	37,200	35,500	36,800	39,800

Exhibit 2.3
2010 and 2025 Design Volumes Along Grand Avenue

Grand Avenue Segments	Design Volumes (Average Daily Traffic)	
	2010	2025
West of Loop 303	25,900	53,700
Loop 303 to RH Johnson/Sunshine	31,100	50,200
RH Johnson to Meeker/Reems	30,000	53,000
Meeker to Litchfield	34,400	49,000
Litchfield to Bell	32,600	52,700
Bell to Dysart	27,600	49,200
Dysart to Greenway	29,600	42,700
Greenway to El Mirage Road	39,700	49,600
El Mirage to Thompson Ranch/Thunderbird	31,700	40,800
Thunderbird to 111th Ave	36,600	43,700
111th Ave to 107th Ave	41,500	46,600
107th Ave to 103rd Ave	42,700	48,800
103rd Ave to 99th Ave	44,900	51,000
99th Ave to Loop 101	42,000	57,100
East of Loop 101	29,800	42,600

Source: URS based on MAG forecasts

Exhibit 2.4
2010 and 2025 Design Volumes at Grand Avenue

Cross Street	Design Volumes (Average Daily Traffic)	
	2010	2025
Loop 303	11,900	50,800
RH Johnson/Sunshine	14,600	20,600
Meeker/Reems	21,100	26,100
Litchfield Road	13,600	24,800
Bell Road	40,400	57,300
Dysart Road	14,900	28,200
Greenway Road	14,100	19,300
Thompson Ranch/Thunderbird	12,500	25,200
111th Ave	12,300	16,200
107th Ave	23,000	29,400
103rd Ave	14,000	16,100
99th Ave	27,400	36,600

Source: URS based on MAG forecasts

Grand Avenue as an expressway were not used as design volumes because of the minimal difference in volumes and the preference expressed by local agencies that wish to maintain access including signalized intersections that would be incompatible with the expressway concept. The final decision on the ultimate concept for Grand Avenue will be part of the MAG Regional Transportation Plan process that is currently under way.

Model runs #5 and #7 were then compared to determine the impact to future Grand Avenue traffic volumes if population and employment growth in the influence area are higher than the DES projections. The alternative higher growth projections resulted in significantly higher traffic forecast (+4,000 vehicles) for only segments northwest of the Meeker Boulevard/Grand Avenue intersection. Therefore, model run #5 was chosen as design volumes except for those segments northwest of the Meeker Boulevard/Grand Avenue intersection for which the volumes used came from model run #7. As a result, forecast traffic volumes remain fairly consistent the full length of Grand Avenue between Loop 101 and Loop 303. The 2025 design volumes on Grand Avenue range from 40,800 to 57,100 vehicles per day.

Model run #8 represents a scenario where grade separations were added to Grand Avenue between Loop 101 and Loop 303. The model run shows that with the grade separations the traffic forecasts for the corridor would not increase over the design volumes. The volumes on Grand would not increase because the capacity of Grand Avenue is restricted by the large number of remaining signalized intersections. It is expected that some traffic volumes on the cross streets without the grade separations would divert to cross streets that have the grade separations.

Model run #9 represents a scenario with Grand Avenue as a six-lane freeway between Loop 101 and I-17. This model run represents the maximum capacity benefit associated with removing traffic signals along Grand Avenue. Traffic volumes under this scenario are expected to increase significantly within the study corridor. Volumes are expected to range between 48,000 and 152,000 vehicles per day.

2.3 Future Level of Service – No-Build Alternative

As defined in the 2000 *Highway Capacity Manual*, level of service is a quality measure describing operational conditions within a traffic stream. Six levels of services (LOS) are defined using letters for each type of roadway facilities. LOS A represents the best operating condition; LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions. In urban areas, LOS D is usually acceptable to the public. However during peak periods, LOS D is often unattainable and LOS E is acceptable to local jurisdictions.

The level of service of an arterial street is controlled by the how well vehicles can pass through the signalized intersection along the arterial. The level of service was calculated at the intersections along Grand Avenue using procedures from the 2000 *Highway Capacity Manual*. Year 2010 and 2025 level of service was estimated using the 2010 and 2025 design volumes developed above and existing intersection geometrics. Exhibit 2.5 summarizes the estimated level of service at the major intersections along Grand Avenue for the A.M. and P.M. peak hours in Year 2010 and 2025.

Exhibit 2.5
2010 and 2025 Intersection Level of Service (No-Build Alternative)

Intersection	Level of Service			
	2010		2025	
	AM	PM	AM	PM
RH Johnson/Sunshine	C*	C	F*	F
Meeker/Reems	D	D	F	F
Litchfield Road	B	C	D	F
Bell Road	F	F	F	F
Dysart Road	C	C	F	F
Greenway Road	D	D	F	F
Thompson Ranch/Thunderbird	F*	F	F*	F
113th Ave	B	B	C	E
111th Ave	D	D	E	F
107th Ave	E	F	F	F
103rd Ave	D	D	D	D
99th Ave	D	D	F	F

*Level of Service is estimated because turn movements were not available to calculate LOS.

Three Grand Avenue intersections are expected to operate at LOS E or worse in 2010: Bell Road, Thunderbird Road, and 107th Avenue. In 2025, all the intersections except 103rd Avenue are expected to operate at LOS E or worse. The geometric improvements needed at each intersection so that the intersection will operate at LOS D or better are presented in Section 3.2.

3.0 ROADWAY NEEDS

3.1 Capacity Improvements Needs for Grand Avenue

Grand Avenue has an inconsistent cross-section; typically four lanes are provided except between 99th Avenue and 103rd Avenue where there are six lanes. A safety concern has been raised by the public at locations where the six-lane section merges back to four-lane section as it causes driver confusion.

Based on the capacity analysis of the intersections along Grand Avenue, three lanes in each direction on Grand Avenue are needed today through the 107th/Grand and Bell/Grand intersections to achieve LOS D. The analysis indicates that the daily capacity of the four-lane sections of Grand Avenue is approximately 35,000 vehicles. The existing daily traffic volumes for the sections of Grand Avenue between Loop 101 and the Thunderbird/Grand intersection approach 35,000 vehicles. Therefore, Grand Avenue will need to be widened to six lanes between Loop 101 and the Thunderbird/Grand intersection by 2010.

Between the Thunderbird/Grand intersection and Loop 303, Grand Avenue needs to be widened to six lanes by 2025. A six-lane section of Grand Avenue should provide a capacity approaching 55,000 vehicles. This capacity should accommodate forecast volumes on Grand through 2025.

3.2 Intersection Improvements Needs

A concern of local jurisdictions, community representatives and the public including the elderly is the potential that emergency vehicles may have their access to Boswell and Del E. Webb hospitals blocked by train traffic on the Burlington Northern Santa Fe Railroad (BNSF) rail line. This is a potential life-threatening issue that affects the Northwest Valley because the hospitals serve all the communities on both sides of Grand Avenue. Access to the hospitals from Grand is provided via 103rd Avenue, 107th Avenue, Meeker Boulevard and RH Johnson Boulevard. A grade separation of the railroad and a connection from Grand to each hospital has been identified as a corridor need and as a solution for eliminating the possibility of access to the hospitals being blocked by trains.

Based on the capacity analysis of each intersection, the following improvements are needed for the intersections to operate at LOS D or better.

99th Avenue

2010

- Adjust signal timing

2025

- Add exclusive northwest bound (NWB) and southeast bound (SEB) right turn lanes to Grand Avenue
- Add southbound (SB) left turn lane on 99th Avenue to create dual left turn lanes

107th Avenue

2010

- Widen Grand Avenue to three through lanes in each direction (project is needed now)

2025

- Add SB and northbound (NB) left turn lanes on 107th Avenue to create dual left turn lanes

111th Avenue

2010

- Adjust signal timing

2025

- Widen Grand Avenue to three through lanes in each direction

113th Avenue

2010

- None

2025

- None

Thunderbird Road/Thompson Ranch Road

2010

- Widen Grand Avenue to three through lanes in each direction

2025

- Add SB left turn on Thompson Ranch Road to create dual left turn lanes
- Include a signal overlap phase for NB right turn lane on Thunderbird Road
- Add NWB left turn on Grand Avenue to create dual left turn lanes

Greenway Road

2010

- None

2025

- Widen Grand Avenue to three through lanes each direction

Dysart Road

2010

- None

2025

- Widen Grand Avenue to three through lanes each direction
- Widen Dysart Road to two through lanes each direction
- Add a SB left turn on Dysart Road to create dual left turn lanes

Bell Road

2010

- Widen Grand Avenue to three through lanes in each direction (project is needed now)
- Add NWB and SEB left turn lanes on Grand Avenue to create dual left turn lanes
- Include a signal overlap phase for EB right turn lane on Bell Road

2025

- Widen WB Bell Road to three lanes
- Construct a grade separation

Litchfield Road

2010

- None

2025

- Widen Grand Avenue to three through lanes in each direction

Meeker Boulevard/Reems Road

2010

- Include NB protected left turn phase on Reems Road and SB protected left turn phase on Meeker Boulevard (implementation is currently under evaluation by ADOT)
- Add a SB left turn on Reems Road to create dual left turn lanes

2025

- Widen Grand Avenue to three through lanes in each direction
- Add NWB left turn on Grand Avenue to create dual left turn lanes

RH Johnson Boulevard

2010

- None

2025

- Widen Grand Avenue to three through lanes in each direction
- Include NB and SB protected left turn phase on RH Johnson Boulevard

A need identified by the public at all of the intersections is to lower the railroad at cross streets to match the grade of Grand Avenue. Lowering the railroad could improve sight distance and increase drivers' comfort. Evaluation of safety devices such as gates at the railroad crossings has been identified as another need. Other general intersection needs identified include extension of exclusive turn lanes to provide for more storage, better turn lane designations and more pavement marking extensions through intersections. The intersection of Dysart Road and Grand Avenue was stated as a location needing these improvements. Inadequate signal timing for pedestrians to cross intersections was identified as a concern.

3.3 Roadside Development Needs

This section presents needs that have been identified during the study that relate to the side of the road and median areas. The lack of guardrail along sections of the drainage channel paralleling Grand Avenue has been raised as a major safety concern.

Traffic signage has been identified as inadequate in meeting the needs of the elderly population. Suggested improvements for traffic signs include providing larger letters and clear and concise directions on signs. Improved street lighting has also been suggested.

There is community interest in further improvements and enhancements to the existing landscaping and ensuring maintenance of the aesthetic features that exist. The public views both the drainage channel and railroad paralleling Grand Avenue as eyesores. The drainage channel also tends to collect trash. There is interest in providing enhanced landscaping to help attract new development or redevelopment to the corridor. Aesthetic treatment of any new transportation

infrastructure is also desired. Attractive designation signage for West Valley Cities has also been requested by the local jurisdictions.

Bicycle and pedestrian needs along Grand Avenue will be identified in Working Paper No. 7, Alternative Mode Needs.

3.4 Intelligent Transportation System Needs

Traffic signals along Grand Avenue are not presently coordinated. There is strong agreement from the public and local agencies that the signals need to be coordinated. ADOT has indicated that the signals need communication links before they can be coordinated. Therefore, a need for the corridor is to provide a conduit along Grand Avenue for fiber-optic communications to support Smart Corridor traffic management functions such as traffic detection, closed circuit television cameras and variable message signs. In addition, the Phase 1 Smart Corridor along Grand Avenue should be extend from Bell Road to Loop 303 (currently it is designated from Van Buren Street to Bell Road). ITS applications consistent with the MAG ITS Strategic Plan should be implement the whole length of the Grand Avenue corridor. Preemption of traffic signals for emergency vehicles is also needed along the corridor.

Traffic signal coordination and other traffic operations improvements along Bell Road from Grand Avenue to Loop 101 are being studied by Maricopa County Department of Transportation.

3.5 Other Needs

There are few continuous routes through the Northwest Valley area. In addition to Grand Avenue, continuous routes include Loop 101, Loop 303 (planned or under construction), 99th Avenue, Olive Avenue and Bell Road. There is a potential opportunity to extend El Mirage Road across Grand Avenue as a new north-south route within the corridor area. The benefits of and complications associated with this idea will be further explored.

Enhancement of east-west streets such as Olive and Northern Avenues may also help accommodate future traffic growth in the corridor area. MAG and participating agencies will be undertaking additional studies of this potential.

Controlling access along a roadway can increase capacity and improve safety; however, it can hinder economic and development opportunities along the roadway. A balance between the two is needed within the corridor. Extending frontage roads and limiting new development access to frontage roads are improvements that have been suggested. However, maintaining existing access to businesses is important. The Town of Youngtown has requested access to Grand Avenue be maintained at 111th Avenue, 111th Drive, and 113th Avenue. Controlling access along Bell Road has also been suggested.